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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/642,619	08/19/2003	Yoichiro Numasawa	2003_1106A	3771

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EXAMINER	
NGUYEN, NGOC YEN M	
ART UNIT	**PAPER NUMBER**
1754	

DATE MAILED: 06/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/642,619	NUMASAWA ET AL.	
	Examiner	Art Unit	
	Ngoc-Yen M. Nguyen	1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) *3,4 and 8-10* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 5-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Applicant's election of Group I, species A_iX_j in the reply filed on March 13, 2006 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 3-4, 8-10 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention and species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on March 13, 2006.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2, 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kelsey (2003/0133853) in view of Wollesen et al (5,960,271), the admitted prior art on page 5, and Kitsunai et al (6,186,153), and optionally further in view of Hoffman et al (6,063,356).

Kelsey '853 discloses a process for producing polysilicon which comprises separating silicon tetrafluoride into silicon and fluorine ions in an inductively coupled plasma in the presence of hydrogen and charging the silicon and fluoride ions to a cold trap wherein molten silicon metal is condensed (note claim 1).

For the pressure of the plasma step, it would have been obvious to one of ordinary skill in the art to optimize the pressure for the plasma step in Kelsey '853 through routine experimentation in order to achieve the best results. The use of other gas, such as nitrogen, the plasma would also have been well within the skill of the artisan.

The difference are Kelsey '853 does not disclose the step of removing fine particles from the plasma step.

Wollesen '271 discloses that the fluorine ions containing gas can be used for etching silicon dioxide in a semiconductor product (note column 4, lines 19-26), instead of being used to produce polysilicon as disclosed in Kelsey '271. When the fluorine ions containing gas is used for etching as disclosed in Wollesen '271, it is well known that any dust in such gas is undesirable, as evidenced by Kitsunai '153, because the attachment or adhesion of dust to substrates under manufacture causes pattern defects in the target devices (note Kitsunai '153, column 1, lines 14-18).

The admitted prior art on page 5 discloses a known technique for removing fine particles using an electroplate as a fine particle collection part which is either inside or connected to the reaction container (note page 5 of the instant specification, first full paragraph).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the fluorine ions containing gas as disclosed in Kelsey '853 in an etching step as suggested by Wollesen '271 because fluorine ions is suitable for removing silicon oxide layer and to remove any dust contained in the such fluorine ions

containing gas using the technique disclosed in the admitted prior art in order to prevent pattern defects cause by dust, as disclosed in Kitsunai '153.

Optionally, Hoffman '356 can be applied to teach that one important source of contamination in semiconductor manufacture is impurities in the process chemicals. Since the cleanups are so frequent and so critical, contamination due to cleanup chemistry is very undesirable. The extreme purity levels required by semiconductor manufacturing are rare or unique among industrial processes. At such extreme purity levels, handling of chemicals is inherently undesirable (though of course it cannot be entirely avoided). Exposure of the ultrapure chemical to air (particularly in an environment where workers are also present) must be minimized. Such exposure risks introduction of particulates, and resulting contamination. Shipment of ultrapure chemicals in closed containers is still not ideal, since there is inherently a higher risk of contaminants at the manufacturer or at the user's site. Moreover, undetected contamination may damage an expensively large quantity of wafers. Since many corrosive and/ or toxic chemicals are commonly used in semiconductor processing, the reagent supply locations are commonly separated from the locations where front-end workers are present. Construction and maintenance of piping for ultra-high-purity gasses and liquids are well-understood in the semiconductor industry, so most gasses and liquids can be transported to wafer fabrication stations from anywhere in the same building (or even in the same site) (note column 1, lines 37-62). Hoffman '356 discloses systems and methods for preparation of ultrapure chemicals on-site at a semiconductor manufacturing facility, so that they can be piped directly to the points of use. The

disclosed systems are very compact units which can be located in the same building as a front end (or in an adjacent building), so that handling is avoided.

Thus, it would have been obvious to purify by removing the dust in the fluorine ions containing gas of Kelsey to obtain the highest purity gas possible so that such gas can be used as an etching gas for the process of Wollesen '271, as suggested by Hoffman '356, semiconductor manufacturing requires extreme high purity levels.

Claims 1-2, 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Webster (5,684,218) in view of Wollesen et al (5,960,271), the admitted prior art on page 5, and Kitsunai et al (6,186,153), and optionally further in view of Hoffman et al (6,063,356).

Webster '218 discloses that reactive fluorine can be produced by subjecting non-carbonaceous metal fluoride to a plasma to cause the metal fluoride to dissociate into a gaseous mixture of metal and reactive fluorine (note column 2, lines 15-19). The preferred metal fluorides include NaF, CaF_2 and silicon fluoride such as SiF_4 (note column 7, lines 33-34). When the metal fluoride is SiF_4, the gaseous mixture of silicon and active fluorine is obtained.

The difference is Webster '218 does not disclose that the step of remove silicon from the gaseous mixture to obtain a gas containing reactive fluorine.

All the secondary references are applied as stated above.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the gas containing active fluorine as disclosed in Webster

'218 in an etching step as suggested by Wollesen '271 because fluorine ions is suitable for removing silicon oxide layer and to remove any dust contained in the such fluorine ions containing gas using the technique disclosed in the admitted prior art in order to prevent pattern defects cause by dust, as disclosed in Kitsunai '153.

Optionally, Hoffman '356 can be applied as stated above to teach that semiconductor manufacturing requires extremely high purities and purification step is desired to be carried out on-site.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Applicants are requested to provide a copy of the Sato et al reference as mentioned on page 5 of the instant specification.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner is currently on Part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Stanley Silverman can be reached on (571) 272-1358. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 or (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed (571) 272-1700.

Ngoc-Yen M. Nguyen
Primary Examiner
Art Unit 1754

nmn
June 11, 2006